

**ICERYA PURCHASI MASKELL, COTTONY CUSHION SCALE
(HEMIPTERA: MARGARODIDAE), CAUSING DAMAGE TO
ORNAMENTAL PLANTS GROWING OUTDOORS IN LONDON**

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ABSTRACT

Icerya purchasi Maskell is reported as established outdoors in England for the first time. It has been found on ornamental plants belonging to 24 genera, and caused severe damage to *Acacia dealbata*, *Choisya teruata*, *Hebe* sp., *Laurus nobilis* and *Pyracantha coccinea*. Interception records of *I. purchasi* on imported plant material to England are summarised.

INTRODUCTION

Icerya purchasi Maskell is probably native to Australia (CAB International, 2002), but has been spread by international plant trade to such an extent that it is now found throughout the warmer parts of the world. It has numerous common names of which the most widely used in English are 'Fluted scale' and 'Cottony cushion scale'. It occurs throughout the Mediterranean and appears to have recently increased its natural geographical range northwards in Europe. Severe infestations were found on ornamental plants in the centre of Paris, France, in 1999 (Matile-Ferrero *et al.*, 1999). It has been detected in Britain on many occasions on imported plant material and transient populations have existed in glasshouses. During 1996, 2001 and 2002, *I. purchasi* was found breeding on plants growing outdoors in Greater London and Addlestone, Surrey. The purpose of this communication is to report the occurrence of *I. purchasi* breeding outdoors in Britain for the first time.

Slide-mounted specimens of *I. purchasi* from these records have been deposited at the Central Science Laboratory, Sand Hutton (CSL) and The Natural History Museum, London (BMNH).

FIELD DESCRIPTION

In life, *I. purchasi* is very distinctive (Fig. 1) and it is unlikely to be confused with any native scale insect (Coccoidea) found in Britain. The adults are large (body with ovisac up to 10 mm long), oval, reddish brown with a granular surface and an orange-red border, with small dorsal tufts of white wax and black setae. The legs and antennae are black. Each wingless adult carries a large, white, fluted ovisac up to 15 mm long. The immature stages have red bodies covered in white and yellow wax and long, thin, translucent wax rods.

Icerya purchasi usually feeds along the major veins on the lower leaf surfaces, and on the stems of host plants, often congregating in large, conspicuous masses.



Figure 1. Adults of *Icerya purchasi* with ovisacs

Authoritative identification of *I. purchasi* requires microscopic examination of slide-mounted adults (preferably teneral). There are tufts of black hair on the body, unlike most other *Icerya* species worldwide, in which the body hairs are not pigmented. Useful references for the identification of *I. purchasi* include Rao (1951), Howell & Beshear (1981), Williams & Watson (1990) and Morales (1991).

HOST PLANTS AND BIOLOGY

Icerya purchasi is highly polyphagous, attacking mainly woody ornamental and crop plants including fruit and forest trees. The host-plant genera most widely grown in Britain are: *Acacia*, *Begonia*, *Bnxus*, *Camellia*, *Choisya*, *Citrns*, *Cytisus*, *Elaeagnus*, *Euphorbia*, *Fragaria*, *Fuchsia*, *Hebe*, *Hedera*, *Hydrangea*, *Impatiens*, *Jasminum*, *Juncus*, *Labrmmm*, *Laurus*, *Medicago*, *Morus*, *Pelargonium*, *Pittosporum*, *Prunus*, *Quercus*, *Rosa*, *Senecio*, *Spiraea*, *Syringa* and *Ulex*.

The species has four instars in the hermaphrodite wingless adult and five instars in the rare, winged male (Morales, 1991). Each wingless adult has a pair of ovotestes and produces 600–1000 eggs, normally by self-fertilisation. The eggs are laid in a

fluted ovisac of white wax secreted at the posterior end of the insect; this shelters them until the crawlers hatch and disperse. Fecundity varies with the size of the parent, the quality of the host plant, and climatic conditions. The functional males develop from unfertilised eggs and are uncommon; each has a single pair of brown wings and long, hairy antennae.

The first instar crawlers are the only stage of *I. purchasi* that actively and passively disperses; subsequent stages of the wingless form are sessile unless seriously disturbed. Each crawler is only capable of walking a few metres before settling to feed. However, strong wind can pick up crawlers and carry them for considerable distances. On Aldabra Atoll in the Indian ocean, Hill (1980) recorded crawlers of the related species, *I. seychellarum* (Westwood) being taken by wind to an altitude of 6 metres and over a distance of 3.5 kilometres.

Several predators and some dipterous parasitoids have been recorded attacking *I. purchasi* in tropical and subtropical countries, of which members of the genus *Rodolia* (Coleoptera: Coccinellidae) are often the most important natural enemies.

GEOGRAPHICAL DISTRIBUTION

Iceya purchasi is generally considered to have originated in Australia, but its wide climatic tolerance has enabled it to become established as a pest in southern Europe, unlike related *Iceya* species (CAB International, 2002). It has been discovered periodically in glasshouses in temperate regions, and was recorded as established outdoors in France (Paris) in 1999 by Matile-Ferrero *et al.* (1999). Its recent establishment in northern France and Britain suggests that the species may be extending its distribution northwards, possibly as a result of climate change.

RECORDS OF *ICERYA PURCHASI* IN BRITAIN

Iceya purchasi was first recorded from Britain in 1926, on *Pittosporum* plants imported from France two years earlier and grown under glass in Derby (Green, 1926). Green considered that *I. purchasi* could become "a serious pest in our plant houses, though it is improbable that it could survive a winter in the open". The infested plants were destroyed. The species was later found breeding on *Acacia* plants in a conservatory in Cheshire in 1931; Green (1931) reported that "the second invasion was a more serious affair". The Plant Pathology Laboratory, Harpenden, organised the eradication of the infestation but *I. purchasi* continues to be intercepted in Britain on imported plant material and transient populations have been found breeding under artificial conditions (Boratynski & Williams, 1964).

Recent interceptions of *I. purchasi* by the Plant Health and Seeds Inspectorate (PHSI) at commercial plant nurseries include the following: Buckinghamshire, Aylesbury, on *Laurus nobilis* L. from Italy, 19.ix.2002; Cambridgeshire, Ely, on *Citrus sinensis* (L.) Osbeck from Italy, 5.iii.2003; Huntingdon, on *Adenanthos* sp. from Israel, 14.v.1998; Cheshire, Knutsford, on *Adenanthos* sp. from Israel, 24.viii.2001; Cornwall, Penzance, on *C. sinensis* from ?Italy, 28.iv.1997; Essex, Kirby Cross, on *C. limou* (L.) Burm. and *C. sinensis*, origin unknown, 11.xii.2002; Greater London, on *C. limou* from Italy, 7.ix.1998; Ham, on *C. limou* from Italy, 4.ix.1998 (present for 18 months), on *C. mitis* Blanco, "*C. myrtifolium*", *C. limou* and *C. sinensis* from Italy, 20.iii.2000; Hampshire, Ampfield, on *Citrus* sp. from Italy, 23.i.2001; Ringwood, on *C. reticulata* Blanco and *C. ushii* (Mak.) Marcov. from Spain, 6.ix.1999; Lincolnshire, Spalding, on *C. reticulata*, 22.v.1998, on *Pittosporum* from ?Israel, 24.x.2000; Middlesex, Enfield, on *C. limou*, 17.x.2002; North Yorkshire,

York, on *Citrofortunella microcarpa* (Bunge) Wijnands from The Netherlands, 28.v.2002; Surrey, Banstead, on *L. nobilis* from Belgium, 27.iii.2000; West Sussex, Barnham, on *Leucospermum* sp. from Israel, 26.iii.2001; and West Grinstead, on *Acacia*, *Bougainvillea* and *Citrus* sp., origin unknown, 13.viii.1998.

Andrew Halstead, Senior Entomologist at the Royal Horticultural Society's (RHS) Garden, Wisley, has received the following samples of *I. purchasi* from private gardens since 1999: Cornwall, Truro, on *Acacia* sp., 29.vii.1999; Dorset, Monk Sherbourne, on *Acacia dealbata* Link, 18.i.2002; Durham, Washington, on *Citrus* sp., 7.xi.2000; Kent, Maidstone, on *Citrus* sp., 10.xi.1999; Chislehurst, on *Citrus* sp., 5.ii.2001; Lincolnshire, Spalding, on *A. dealbata*, 17.iv.2001; Surrey, Ockley, on *A. dealbata*, 24.vii.2000; West Sussex, Ferring, on *A. dealbata*, 5.xii.1999; and Wiltshire, Salisbury, on *Citrus* sp., 24.x.2001, but it is not known which of these records were collected outdoors.

However, *I. purchasi* definitely has been found breeding outdoors in Britain at eight localities, most within Greater London: Balham (SW12), on *Acacia* sp., ?*Acer* sp. and ?*Cotoneaster* sp., 8.xi.2002; Barkston Gardens (SW5), on *Acacia dealbata*, 20.x.2001; Bishopsgate, on *Acacia* sp. and *Hedera helix* L. growing over a building, 12.ix.1996; Chelsea (SW10), in very large numbers on two *L. nobilis* and two *Choisya ternata* (La Llave & Lex.) Kunth plants, viii.2002 (the householder believed that an *Acacia* sp. had been killed by the pest); Chelsea Park Gardens (SW3), on *Acacia* sp., 5.ii.2003; and Fulham (SW6), in several adjacent gardens on *Begonia* sp., *Camellia japonica* L., *Choisya ternata*, *Dahlia* sp., *Elaeagnus* sp., *Hebe* sp., *Hedera helix*, *Hydrangea* sp., *Impatiens* sp., *Jasminum* spp., *L. nobilis*, *Prunus* sp., *Pyracantha coccinea* M. Roem., *Quercus* sp., *Rosa* sp., *Senecio* sp., ?*Spirea* sp., *Syringa* sp. and *Wisteria* sp. Heavy infestations caused severe damage to *C. ternata*, *Hebe* sp., *L. nobilis* and *P. coccinea*. The owner of one of the infested gardens described some plants as looking as if they had been burnt, due to the foliage being completely smothered in black sooty mould growing on honeydew excreted by the insects. *Icerya purchasi* has been collected also from the formal gardens at Hampton Court Palace on *Citrus* sp., 24.viii.2002; and on *L. nobilis*, 22.xi.2002. The *Citrus* plants were protected during the winter. Most recently, it was found in Surrey, Addlestone, on *A. dealbata* and *H. helix* growing against the wall of a row of terraced houses, 24.xi.2002; and in London (SW3) on *Laburnum* sp., *Acacia* sp. and *H. helix*, 16.xii.2003.

ECONOMIC IMPORTANCE

Icerya purchasi is economically most important in the Mediterranean as a pest of *Acacia*, *Citrus* and *Pittosporum*. Infestation by the scale damages plants mainly by sap depletion; shoots dry up and die, and defoliation occurs. In addition, the copious honeydew excreted by the insects coats adjacent leaves, often giving rise to sooty moulds, blocking light and air from the leaves and impairing photosynthesis.

The regulation of *I. purchasi* by natural enemies is one of the classic success stories in biological control. A detailed account of the introduction of the Vedalia beetle, *Rodolia cardinalis* (Mulsant), into California and its control of *I. purchasi* is given by Caltagirone & Doutt (1989).

REMARKS

The number of identifications of *I. purchasi* made by the Royal Horticultural Society, Central Science Laboratory and The Natural History Museum has increased

during the last ten years, indicating that this pest is being imported into Britain more frequently. The increase is almost certainly due to the growing popularity of conservatory plants, such as *Citrus* spp. and *Acacia dealbata*, which are usually imported from the Mediterranean and may harbour early nymphal stages of *I. purchasi* that go undetected at plant quarantine inspection.

Icerya purchasi has the potential to spread more widely outdoors in sheltered situations in southern England and particularly in large urban heat islands, such as London. It can be moved over long distances by wind (Hill, 1980) and on ornamental plants in trade (CAB International, 2002), and has been found at commercial plant nurseries on numerous occasions.

Suspected outbreaks, or interceptions, of non-indigenous insects on growing plants should be reported to the Department for Environment, Food and Rural Affairs (Defra), Plant Health and Seeds Inspectorate office or the PHSI HQ, York (Tel.: 01904 455174, Fax: 01904 455197) and samples submitted to CSL for identification.

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